GEOGRAPHIC SCHOOL BULLETINS

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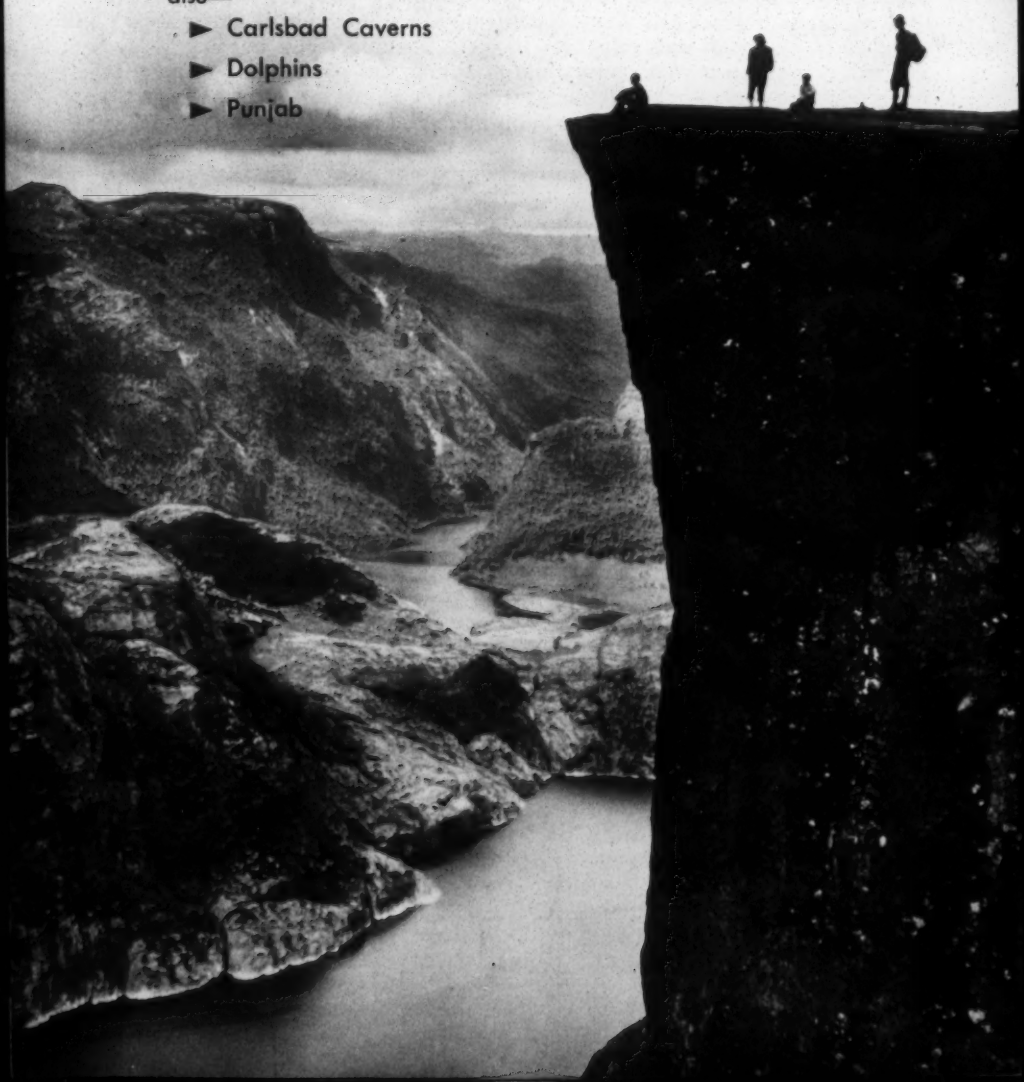
SCANDINAVIA

also—

- Carlsbad Caverns
- Dolphins
- Punjab



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coast, not just to sea level, but far below. When the glaciers receded, the sea tumbled into the empty crevices. Now salty fingers, the famed fjords, twist far inland, one as far as 120 miles. Fjord-side mountain walls are so tall that farm families living on a precipice sometimes tether little children to keep them from tumbling off the high cliffs.

Glaciers also swept over Sweden, and Baltic shores are dented with *fjards*. These resemble Norway's fjords, but are smaller and less jagged. Between the coasts, the ice clawed up much of the soil that could have nurtured crops, leaving much of Scandinavia barren of farmland and spotted by bare rock, brown heath, lakes, and bogs.

But the rugged face of their land has not defeated the Scandinavians. Nearly 10,500,000 Norwegians and Swedes live on the Peninsula—about half the size of Alaska but with nearly 50 times its population.

Ocean currents are their biggest ally. The Arctic Circle, which touches the world's cold spots—Greenland, Alaska, Siberia—also crosses Norway and Sweden. But the climate for such a northern latitude is surprisingly mild. The Norwegian Coastal Current, a Gulf Stream offshoot, pours mild water around western Norway at the rate of 100,000,000 cubic feet a second, filling the fjords beneath glacier-topped mountains with warmth. This current raises the temperature of all Norway above normal for that latitude.

SCANDINAVIAN FARMING: VERTICAL AND HORIZONTAL—Sure-footed Norwegian Dun hauls hay up glacial-carved Norway hillside. Swedish farm lies flat in the sun, below.

Dripping southwesterly Atlantic winds also bring warm air and rain to the 1,100-mile-long Peninsula. Southern Sweden's summers resemble those of New England.

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Scandinavian Peninsula

Warm Currents Make Cold Latitudes Livable

RUGGED AND HANDSOME, the Scandinavian Peninsula hangs over Europe as commandingly as the Pulpit (see cover) juts above Norway's Lyse Fjord.

Norwegians and Swedes, kissing cousins but distinct nationalities, fill the stony Peninsula with fair-haired people who are models of the modern world for peaceful industry and zestful living.

They come by their energy naturally, being descended from the Vikings. Norwegians sailed the coasts of Europe and even America 500 years before Columbus. Swedes crossed the Baltic and followed the rivers into the heart of Russia.

Medieval lords built huge brick and stone castles. Recalling Sweden's glorious days as a world power in the 17th century, many castles stand today. Kalmar Castle, above, witnessed the signing of the Kalmar Union which tied together Norway, Sweden, and Denmark in 1397. Wars later split them.

Today Lapps rove the tundra of northern Norway and Sweden where the midnight sun bathes the land. Their self-sufficient reindeer economy provides them with milk and meat, skins for clothing and tents, and teams for drawing their canoe-shaped sleighs. Northern resort hotels close down no more for the winter. Lapp children use them for schools.

Cities dominated by modern structures of steel and glass rise in the south of the Peninsula. Medieval buildings line docksides. Farm houses balance precariously on Norway's western mountainsides, and wheat fields spread across southern Sweden's lowlands.

Ice Age glaciers gave Scandinavia its stern mien. The big white blankets spread over the Peninsula. They ground down the native rock of Norway's west

Photographs by Andrew H. Brown, National Geographic Staff

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But the ingenious schemes of man are not enough, and Scandinavia must still import much of its food.

These Peninsular people depend on trade. If their Viking ancestors could make their fortune at sea, why not modern Scandinavians? As early as 1560 timber, fish, and iron left Bergen, Norway (above), for English and Dutch harbors.

What port in the world today has not seen the Norwegian or Swedish flag flying from a merchant ship? Scandinavians sell what they have—the produce of forests, factories, and mines—to buy what they have not—food and some raw materials.

Where Scandinavia's glaciers stop, forests begin. A blanket of pine and spruce is its chief wealth. Beech, birch, oak, alder, aspen, and willow also grow. Forests are widespread in Sweden and cover one-fourth of mountainous Norway.

Logs jam Sweden's rivers, floating to pulp and sawmills on the Gulf of Bothnia coast where pulp, paper, rayon fiber, lumber, and wall-boards can be loaded easily on ocean-going vessels. In central Sweden, where strips of land are arable, potato farmers work their small plots in summer, cut timber in winter.

ELIZABETH MEYER; E. DAHLBERG, THREE LIONS, ABOVE

FISH AND FUN — Swedish fishermen in the Baltic bring in prize salmon in big bow nets, above. The Norwegian lad below takes his first steps—on skis. Norway introduced the sport to the world.

The Gulf Stream that warms the Peninsula also attracts myriads of fish. Fjord dwellers reap a rich harvest of cod, herring, and mackerel from the sea. River fishermen net salmon.

Fish — smoked, fresh, iced, dried, salted, canned—and its products are shipped from Norwegian ports to world markets.

Minerals underlie the rocky soil. Iron ore, dug from Swedish mines floodlit in the northern winter darkness, supplies hungry factories in Western Europe.

Countless rivers provide cheap power to bustling industry. Swedes turn their iron ore into famous stainless steel and timber into safety matches.

Norwegians and Swedes speak languages closely enough related that they can cross the border, converse readily, and compliment each other on the good life in Scandinavia. L.B.

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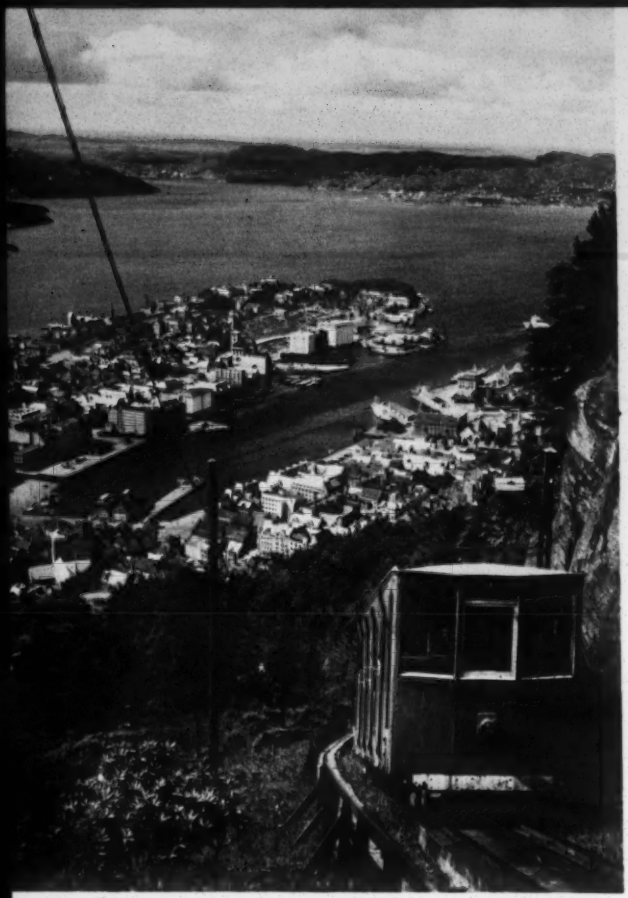


MOUNTAIN CLIMBER — A cable car scales 1,000-foot Floyfjellet, giving its passengers a spectacular view of Bergen, Norway's second city (Oslo, the capital, is first). Bergen has been an important hub of trade since 1070, not only with countries across the sea but with the rest of long, ocean-fronting Norway. Shipbuilding along the waterfront, textile, flour, and steel mills preserve the city's bustling character.

Scandinavian cities are not large. Bergen's population of 150,000 would fit into a little less than half of Rochester, New York. Stockholm, Sweden's capital and largest city, is not as big as Cleveland, Ohio. All of Sweden's people could live in New York City; all of Norway's, in Chicago.

Nature has smiled most on Scandinavia's south. This is where cities cluster and where the commercial and industrial heart beats. Population thins as the Peninsula travels north.

Little of the Peninsula is fertile—Sweden can cultivate a bare 8 per cent of the country. Most is too stony, too sandy, too swampy. Norwegians farm less than 3 per cent of their side. But Scandinavians have made every possible foot of land and every plow stroke count.

One-third of the Swedish people farm for a living. They have learned to grow potatoes north of the Arctic Circle and strawberries in the south. By applying modern farming methods they have learned to glean one of the highest yields per acre in the world. Most production comes from "the Garden of Sweden," where vast grain fields stretch over southern lowlands, fat cattle graze on lush pastures of grass and clover, and orchards hang heavy with fruit.

While Sweden has at least a southern region of lowlands and a central section of rolling hills where agriculture is feasible, just getting Norway into farming condition was a Herculean task. The glaciers had mixed boulders and cobblestones by the million in the soil. Each surface stone had to be removed. Work-calloused hands built miles of stone walls like those in New England.

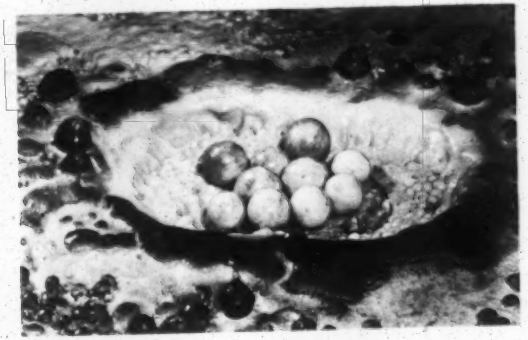
Coastal hills run nearly straight up, and Norwegian farmers had to search for a way to plow those hills. They hit on the idea of a cable. An engine, secured at the top of the field, pulls plow and harrow straight up on a wire. Bundles of hay whip down the mountain on the versatile cables.

Hole in the Ground

deposited in a shallow sea 200 million years ago. When the Rockies started growing, about 60 million years ago, the Carlsbad area was uplifted. From then until about a million years ago, ground water entered fissures and dissolved the porous limestone. As water level fell, air filled the cavities.

No one suspected the vast caverns were there until ranchers in the 1880's noticed sky-darkening flights of bats spiraling from a hole in the foothills. In 1901 cowboy James Larkin White began a lifetime of exploration, each kerosene-torch-lighted trip bringing new stone fantasies to view.

Not until 1924 and 1925 were the caverns really put on the map—by an exhaustive National Geographic Society exploration under the direction of Dr. Willis T. Lee. Carlsbad Caverns National Park was established in 1930.



WILLIS T. LEE

In the historic photograph above, Dr. Lee sits spellbound in the Armory, whose stalactites reminded him of Indian war clubs. At left, cave pearls in a stone nest were formed when drops of water coated grains of sand with lustrous minerals. R.G.

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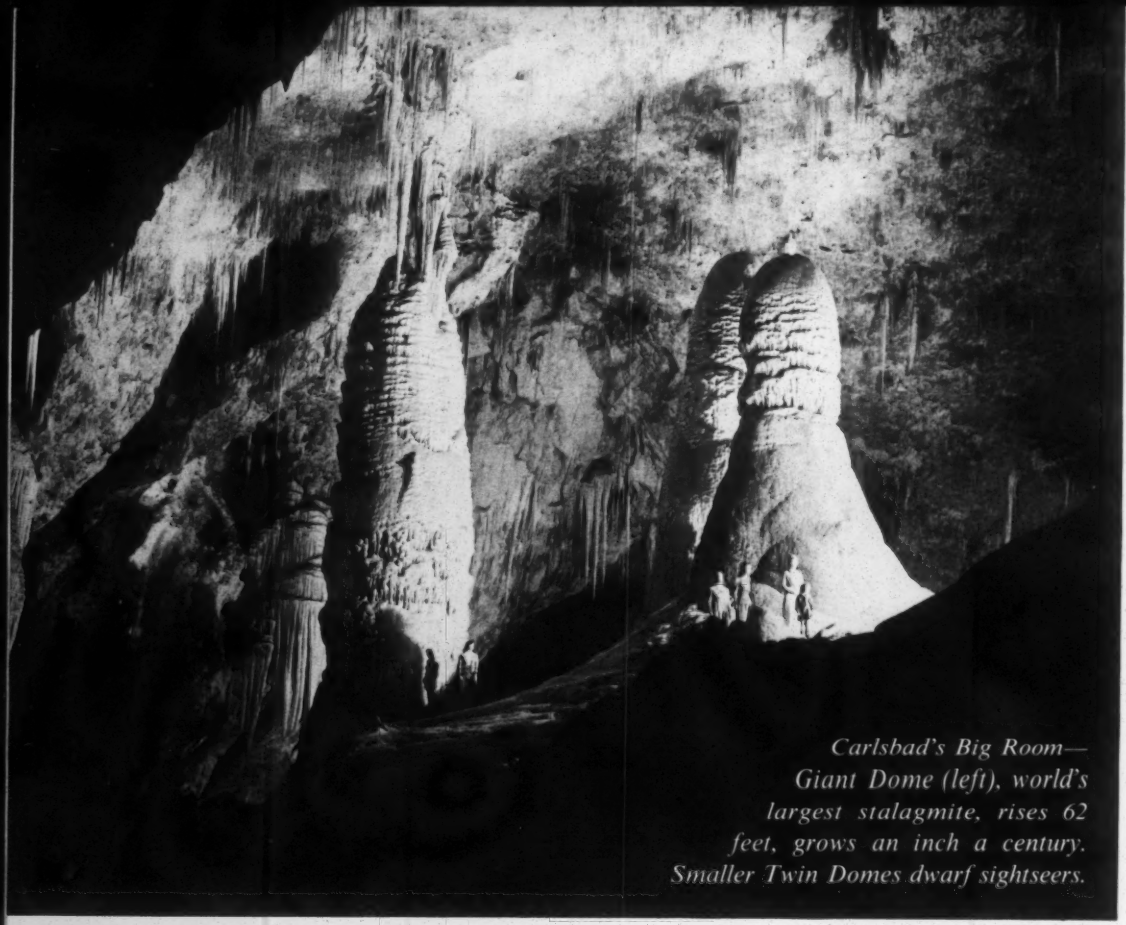


Carlsbad's Big Room—Giant Dome (left), world's largest stalagmite, rises 62 feet, grows an inch a century. Smaller Twin Domes dwarf sightseers.

SANTA FE RAILWAY

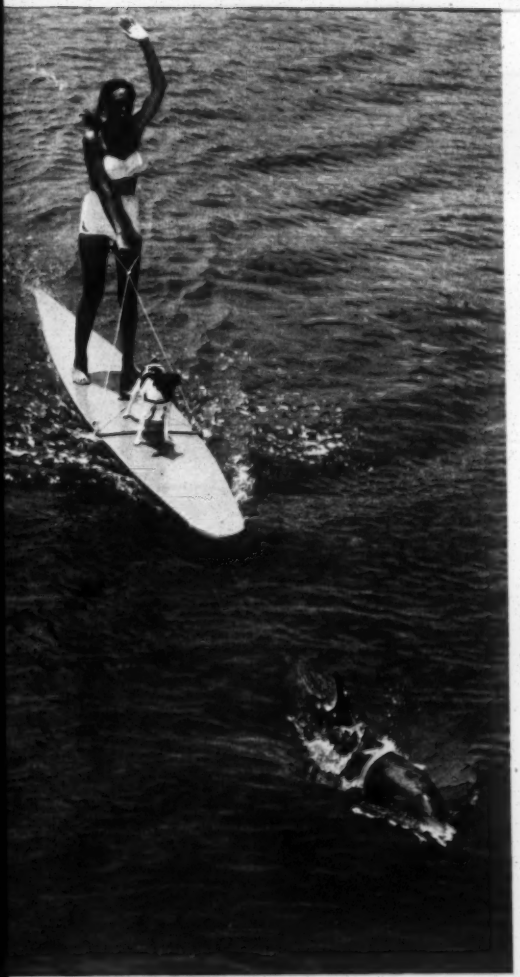
Glorious

BELOW New Mexico's sun-baked surface stretch Carlsbad's cool caverns, a vast and gleaming fairyland enchanting half a million visitors a year.

Dripping water shaped the fantastic formations which make Carlsbad famous. Rain water, seeping from above, picks up limestone. As drops evaporate they deposit minerals, and build — layer by layer — beautiful stalactites and stalagmites.

Stalactites (far right) hang from the ceilings of underground rooms, and stalagmites (left) build up from the floor; to remember which is which imagine that the "c" in stalactite stands for "ceiling," and the "g" in stalagmite stands for "ground."

Like a house, a cave must be constructed before it can be decorated. The decorations (left) rise in the world's largest known underground chamber. It and other rooms and corridors stretching 23 miles were hollowed out of a 1,600-foot-thick layer of limestone that had been



MARINE STUDIOS; FRANK SALISBURY, RIGHT

PORPOISE POWER propels a surfboard and two passengers across a lagoon at Marineland, near St. Augustine, Florida. *Flippy*, the educated porpoise, wears a special harness for the stunt.

imitating his master's words in a Donald Duck-like but unmistakable "voice."

To go with its voice, the porpoise has a highly developed sense of hearing. Together they give him a sonar system an admiral would envy. The porpoise can "look" through 20 feet of muddy water and tell if a small fish is good eating.

Even while giving its all for science, the porpoise retains its frolicsome nature. It seems to harbor little fear of people. One visitor at a marine exhibit made the mistake of tossing a bony fish head into a tank of porpoises. He got it back in his lap. In an excess of exuberance, one porpoise leaped out of the water into its trainer's skiff. At Opononi, New Zealand, bathers grew accustomed to daily visits by another friendly dolphin. It learned to balance balls and bottles on its rubbery snout, allowed its back to be stroked, even gave free rides to small boys, like the dolphin of Greek mythology.

For its winning ways, sailors have long admired the seagoing mammal. An old sea story runs that the souls of dead sailors enter a dolphin, there to frolic forever over the ocean. A.P.M.

TASK FORCE OF PORPOISES hitches a ride on the bow wave of a cruise ship off Australia. By swimming with their tails tilted at an angle to the bow waves, the clever freeloaders catch the full forward thrust of the waves. Ship designers study the porpoise for hints on streamlining. The creature's smooth, flexible skin allows it to glide through the water with scarcely any turbulence. Porpoises have been clocked by researchers at speeds up to 35 knots.

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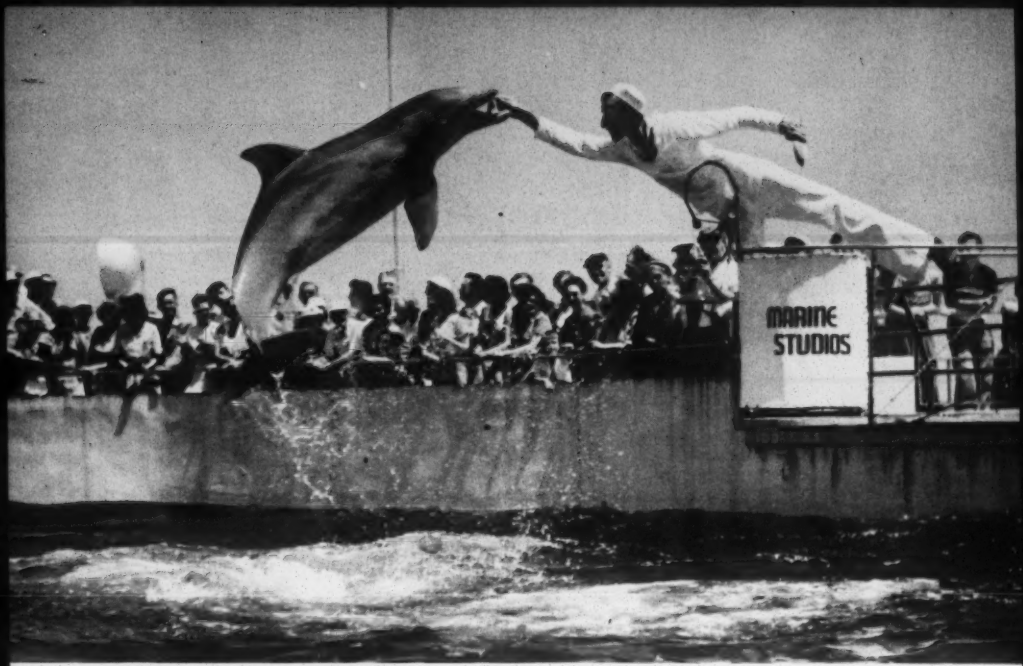

LUIS MARDEN, NATIONAL GEOGRAPHIC STAFF

The Playful Porpoise

Fulfills a Serious Role for Science

THE SLEEK, GRAY DOLPHIN leaps from the water to snatch a small fish from the attendant's fingers. Another star performer, left, gulps its reward with a self-satisfied smile.

Such smugness is understandable. The familiar bottle-nose dolphin, commonly known as the porpoise, is finding its talents appreciated not only by fascinated crowds at oceanariums but by sobersided scientists.

Experts now believe these small members of the whale family may be the world's smartest creatures, after man and possibly the chimpanzee. Those with beaks, science says, are dolphins; those with rounded heads are porpoises. Zoologists who have studied them are deeply impressed with their ability to learn—almost incredibly fast in some tests—and amazed at the wide variety of their emotional responses and interests.

Acquired antics bring marveling gasps from aquarium spectators. At the drop of a fish, a bottle-nose will leap through a hoop, play water polo, or yank a lanyard with its teeth. One trainer even hitched up a willing porpoise to a surfboard.

Science is turning the porpoise to even sterner tests. Recently a scientist coaxed a porpoise to "talk" to him. He knew that porpoises converse with each other underwater in a great variety of buzzes, whistles, rattles, and grunts. Most of the sounds are inaudible to man. But one day a tape recorder caught the porpoise

Prakash would rather play *gilli-danda* (a game played by hitting a kind of puck in the air with sticks) with his friends than carry the lunch to the fields. But he knows that he cannot help plow until he is older and has mastered smaller chores, such as taking the lunch or driving the bullocks home from the field.

So he goes to the courtyard of his home to wait. A shawl shelters him from the sun. But he needs nothing to protect his hardened, always-bare feet from the rough ground.

His grandfather sits on a *charpoy,* a rope bed (right). He contentedly puffs on a hookah. But Prakash must soon leave if he is to get back from the fields in time for school.

From the big wooden door of the house, he calls to his mother to hurry. She looks up and nods. A passer-by has asked her to fill the village trough for his bullock to drink, and she patiently carries buckets of water from the well.

But the boy's young mind has left the street for school. Perhaps today he will learn of Bhakra and Amritsar and other far places. L.B.

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PHOTOGRAPHS BY W. SUSCHITZKY

A Boy's Day In Punjab

WHY doesn't it fall? wonders Prakash, a boy of 8, as his mother swings down their village street, the water bowl balanced on her head.

But it never does. This is the most familiar scene in the world to Prakash. Twice a day his mother leaves their mud-walled house for the village well, returning with the bowl full of water.

She has done it for years. Her mother made the trip before her, and her mother's mother before that.

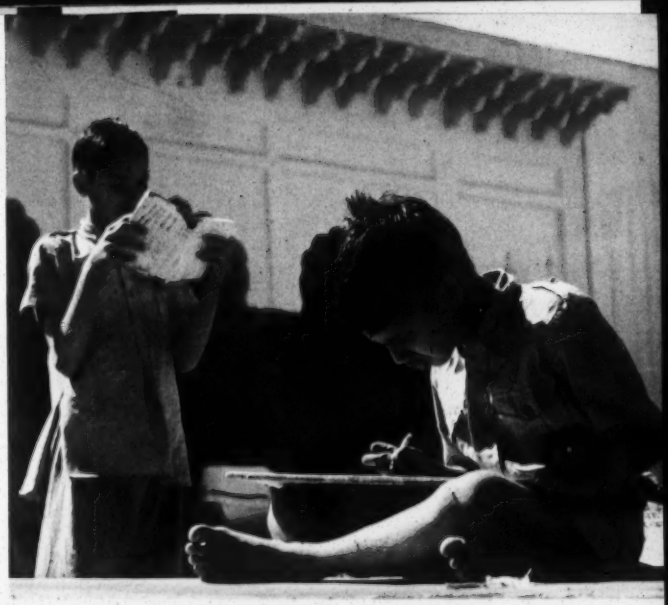
Life has changed little over the centuries in this small village. It lies in the Punjab—literally, "land of five rivers." It is the great grain and cotton growing section of northwestern India. Another part of the Punjab stretches into Pakistan.

Prakash has overheard his parents talking in low tones of moving to another Punjab village. A visitor had told of great wonders in a village near Bhakra Dam—of dams, canals, and irrigation, of threshers, station wagons, and something called air-conditioning that is supposed to keep a boy cool all the time.

He remembers his school friend who does not study with Prakash any more because his parents took him to a city called Amritsar where they would work in a woolen factory.

These are things Prakash does not comprehend. He thinks of his father driving bullocks over their small plot of land. He remembers that today he is to take his father lunch in the fields—a meal of *chapatti* (a kind of wheat flour pancake) and vegetables.

Prakash understands the hot sun that bakes the narrow dirt lanes of the village half the year, and the monsoon rains that soak it from July to September.



PUNJABI SCHOOL DAYS — Prakash joins his friends in front of their new building where they go over their homework before the teacher arrives. One boy writes his lesson. A Hindu alphabet book lies in the lower right corner.

Schools are recent additions in many villages. Gleaming with whitewash, they contrast with the monotonous gray of old buildings.

NEXT STOP, THE LOCAL FAIR, where four pairs of eyes will bulge at the collection of toys for children, cloth for women's *saris*, and animals for the farm.

W. SUSCHITZKY

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